REVIEW ARTICLE

Educational Predictors for the Retention of Physicians in Remote and Unassisted Areas: a Narrative Review

Preditores Educacionais para Fixação de Médicos em Áreas Remotas e Desassistidas: uma Revisão Narrativa

Erika Maria Sampaio Rocha[I,II]
Pablo de Almeida Boiteux[I]
George Dantas de Azevedo[III]
Carlos Eduardo Gomes Siqueira[IV]
Maria Angélica Carvalho Andrade[I]

KEYWORDS

– Medical Education.

–Medical care in unassisted areas.

– Career Choice.

ABSTRACT

This is an international narrative review study, which had the objectives of identifying and understanding the determining educational aspects for the retention of physicians in remote and unassisted areas. Through search on databases, we selected ten articles about medical education institutions and programs that increased the recruitment and retention levels for their alumni in areas where there was shortage of professionals, which clarified the educational aspects associated to such results, and which were considered as predictors for the retention of physicians. The main predictors found were: selection processes that prioritized the admission of students who were previously linked to places where there was a shortage of physicians; the creation of curricular frameworks based on problem-based methodologies focused on local health issues, with an emphasis in primary care and Family and Community Medicine approaches; and the quality of the educational experiences, especially in the primary care environment in rural or remote areas, which, in turn, involve the educational trajectory and experience of professors, as well as the infrastructure and localization of the medical schools in strategic areas. The placement of school is such areas allow close proximity between the professors to the reality of the vulnerable communities. The results of the review still point out that the retention of physicians in unassisted areas demands the confrontation of social, cultural, economic and political factors, which frequently transcend the governability of educational institutions. They also reiterate the need for a wider conceptual uniformity among research studies in order to ensure more solid scientific evidence about the subject, and the importance of conducting studies that contemplate the Latin-American context, specifically Brazil, where the literature on the topic is still scarce.

[I] Universidade Federal do Espírito Santo, Vitória, Espírito Santo, Brazil.
[II] Universidade Federal do Sul da Bahia, Itabuna, Bahia, Brazil.
[III] Universidade Federal do Rio Grande do Norte, Natal, Rio Grande do Norte, Brazil.
[IV] Massachusetts University, Boston, Massachusetts, USA.

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PALAVRAS-CHAVE

– Educação Médica.

– Área Carente de Assistência Médica.

– Escolha da Profissão.

RESUMO

O estudo é uma revisão narrativa da literatura internacional cujos objetivos foram identificar e compreender aspectos educacionais determinantes para fixação de médicos em áreas remotas e desassistidas. A partir de buscas nas bases de dados, foram selecionados dez artigos de revisão sobre instituições e programas de ensino médico que aumentaram a atração e a permanência de seus egressos em regiões de escassez profissional e que explicitaram os aspectos educacionais associados a tais resultados, os quais foram considerados preditores educacionais para fixação de médicos. Os principais preditores encontrados foram: a realização de processos seletivos que priorizaram o ingresso de estudantes previamente vinculados aos locais com escassez de médicos; a construção de estruturas curriculares com metodologias de problematização com foco em questões locais de saúde e com ênfase na abordagem clínica da atenção primária à saúde e da Medicina de Família e Comunidade; e a qualidade das experiências formativas, sobretudo nos cenários de atenção primária, em áreas rurais ou remotas, a qual, por sua vez, envolve a formação e a experiência docente, assim como a infraestrutura e a localização das escolas médicas em áreas estratégicas que permitam a aproximação dos discentes com a realidade das comunidades vulneráveis. Os resultados da revisão apontam ainda que a fixação de médicos em áreas desassistidas demanda o enfrentamento de fatores socioculturais, econômicos e políticos que, frequentemente, transcendem a governabilidade das instituições formadoras. E reiteram a necessidade de uma maior uniformidade conceitual entre as pesquisas, com o intuito de assegurar evidências científicas mais sólidas sobre o assunto e a importância da realização de estudos que contemplem o contexto latino-americano e, de forma específica, o Brasil, onde ainda é escassa a literatura sobre o tema.

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INTRODUCTION

The quantitative deficit and inequalities in the qualification and geographic distribution of health professionals characterize what is conventionally called the global health workforce crisis[1,2]. This problem has increased since the 1990s, due to changes in the demographic and epidemiological profile of the world population, the underfunding of health systems and the displacement of people and information intra- and internationally, resulting in migratory flows of these professionals from low-income and middle income countries for those with high income [3-7]. Among health professionals, the challenges related to doctors are even greater, since in addition to the already mentioned aspects, there are also the specificities of their work process, especially disparities in the distribution between different medical specialties and levels of health care, with enormous damage to Primary Health Care (PHC), which in many countries has not been consolidated as an attractive field of work [2,8]. Understanding the set of complex aspects and different orders that permeate such professional choices is essential to face this scenario of inequalities in health care access.

The World Health Organization (WHO) outlined recommendations for addressing the scarcity and inequalities in the distribution of professionals, with educational strategies being the most structuring in the long term and having the greatest impact in countries that adopt health systems with universal coverage [2,9]. Among the educational strategies, there is evidence in the literature that the experiences one had during graduation significantly influence the decisions of newly graduated doctors, both in the choice of specialty and in the workplace [10]. Medical schools play an essential role in the adequacy of professional training and in the production of scientific evidence that contribute to the effectiveness of health systems and to the improvement of the population's living and health conditions [9,11,12].

Even before the inclusion of this topic in the Brazilian political agenda, several countries developed studies and educational policies to face the shortage of doctors in unassisted areas. However, more robust studies are required to define, among the educational characteristics of undergraduate courses, which factors are positively associated with the settlement of medical professionals in such regions and that can guide other educational programs [13,14].

In Brazil, the "More Doctors" Program (PMM, *Programa Mais Médicos*) stands out as an educational policy associated with the emergency provision of doctors and the strengthening of PHC infrastructure, in accordance with the needs of the Brazilian Unified Health System (SUS, *Sistema Único de Saúde*). Started in 2012, the Program was included in a context of expansion of undergraduate medical seats, based on criteria developed by a working group appointed by the Higher Education Secretariat of the Ministry of Education [15]. Determining factors and predictors of settlement were listed, both in relation to general training and medical specialization. The PMM contemplated the opening of new undergraduate seats and medical residency openings, especially in priority areas, as well as the reorientation of medical training, with a greater emphasis on PHC[16,17]. It also allowed the update of the National Curricular Guidelines (DCN, *Diretrizes Curriculares Nacionais*) for medical courses, establishing 2018 as the deadline for public and private training institutions to adapt their curricular matrices [18].

It is also noteworthy in the Brazilian context, that the adoption of the Family Health Strategy (FHS) prior to the PMM, strengthened PHC with positive impacts on access to services and health indicators [19-21], but the great difficulty in attracting and settling doctors in remote, rural areas and/or those with difficult access has been related to the slow expansion of coverage (about 1.5% per year) [16,22,23]. Moreover, the small number of medical students who contemplates working in small municipalities or specializing in areas linked to PHC or Public Health can aggravate this scenario[8,22,24].

Thus, the topic of educational predictors of doctors' settlement becomes relevant, since they guide the educational policies aiming at facing inequalities in access to care, especially in PHC. However, even though the importance of medical graduation regarding the choices of future professionals is well established in the literature on the topic, gaps remain related to the definition of which specific educational components of this level of training have the greatest influence on the settlement of doctors in rural and/or remote areas[10]. In this sense, the objectives of the present study are to identify and understand the educational predictors of graduation that favor the settlement of future professionals in remote and unassisted areas.

METHOD

This is an international literature narrative review study about the educational aspects that determine the settlement of doctors in unassisted regions or those with professional shortage. This type of study was chosen because of the important role of reviews, especially narratives, in mapping the constructed knowledge or the state of the art on a given topic and pointing out gaps and recommendations for future studies[25].

In the first stage, reviews were selected that addressed the impacts of medical courses on the medical workforce and those with positive results on the settling of their graduates in unassisted regions or those with professional shortages were selected. In the stage, we sought, among the selected reviews, those that explained the educational aspects associated with the good results of these medical schools, considered the determinants, that is, the predictors of medical settlement.

The initial search for reviews was carried out in two phases: database search and manual search based on the references found in the selected studies. The PubMed (US National Library of Medicine), BVS (Virtual Health Library) and LILACS (Latin American and Caribbean Health Sciences Lite) databases were used, which were accessed from February to March 2019. The descriptors were defined according to the Medical Subject Headings (MeSH), for those in English, and according to the Health Sciences Descriptors (DECS, *Descritores em Ciências da Saúde*), for those in Portuguese and Spanish languages.

Having defined the Boolean operators, three search keys were constructed: (medical education OR rural medical education OR rural medical school) AND (career choice) AND (physician distribution); (educación médica OR Estudiantes de Medicina) AND (selección de profesión OR motivación) AND (area sin atención médica) and (educação médica OR estudantes de Medicina) AND (escolha da profissão OR motivação) AND (área carente de assistência médica). Seventeen reviews were selected, eight of them through PUBMED searches and nine by manual search.

Initially, the available abstracts were read, excluding reviews that did not address results from medical schools or that were restricted to the intentions of students or only to residency or continuing education programs. Of these, thirteen reviews remained, which were read in full and ten were selected, which explained the educational factors associated with the positive results of the training institutions, constituting the body of analysis of this study.

This study is part of a doctoral research from the Postgraduate Program in Collective Health, of which entire project was submitted and approved by the Research Ethics Committee (REC).

RESULTS AND DISCUSSION

Among the ten reviews included in the study, all were published in English, from 2008 to 2017, with a predominance of contexts in the United States, Australia and Canada. Regarding the study types, three were narrative reviews published in 2009, 2011 and 2013; two integrative reviews, both published in 2015; three systematic reviews published in 2008, 2013 and 2017, and two meta-analyses published in 2016 and 2017, respectively. Thus, despite the small number of studies, there is a growing investment in the methodological rigor of studies on the topic over the past few years.

Several authors have pointed out methodological limitations in a significant number of studies and a large conceptual variation, especially regarding the terms 'rural area' and 'remote area', as well as the definitions of PHC-related specialties, which makes it difficult to obtain robust scientific evidence. on the topic[26-30].

A summary of the reviews is shown in Table 1, aiming to facilitate the visualization of possible settlement predictors related to medical training, based on the positive results of specific schools or programs.

The process of student selection for medical graduation was identified in most reviews as an important factor for the settlement in rural or urban areas with professional shortages [26,27,29-33]. Several studies have even shown that the ties with the region is the most important isolated criterion, corroborating previous evidence from the literature on the subject [26,27,29,30,34]. It is important to emphasize that this connection is characterized both by the student's origin and by the time of residency and/or high school in these areas.

Similarly, a recent study, carried out with physicians graduated from rural schools in Australia, showed positive results for settlement in rural areas or in small municipalities, with 25% of doctors from these institutions working in these areas [35]. Only 4% returned specifically to their regions and 3% to their city of origin; however, the survey shows the success of the policy in reducing scarcity and inequalities in access, as a significant number of professionals (25%) dispersed and settled in rural regions far from large urban centers.

It is also noteworthy the low percentage of students of rural origin or poorer urban areas in medical courses, as demonstrated, for instance, by Canada, where they represent only 6% of the total number of students [29]. This fact gives rise to two reflections: the first, concerning the importance of universities that hold preparatory courses aimed at high school students from priority areas and favor their selection for graduation, with emphasis on institutions with satellite campuses located in the strategic regions themselves [36] and that maintain institutional policies to support students during the course, in order to minimize/avoid the possibility of school evasion[33]; the second reflection concerns the encouragement to work in these places in the future (and, specifically, in PHC) given to students of urban origin, who comprise the majority of students in medical courses. In this sense, the authors point out strong evidence that financial incentive programs, associated to the reduction of student debts, are related to higher rates of professional settlement in peripheral and/or rural areas[31].

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Table 1

Summary of selected reviews and predictors of doctors' settlement

Author / Year / Journal	Design of Review	Main results	Predictors related to medical education
Rabinowitz, Diamond, Markham e Wortman (2008) *Academic Medicine*	Systematic review	10 studies selected (1972-2002). Six universities promoted an increase in settlement in rural areas (53 to 64%). Highlight: Univ. Minnesota and Univ. Thomas Jefferson with settlement of 87% and 79%, respectively, with a mean stay of 7 years.	1-Selection of undergraduate students taking into account the place of origin and career intention; 2-Curricula with great rural insertion - extended internship, minimum six months or mandatory full time, in the last two years of medical training.
Wilson, et al. (2009) *Rural and Remote Health*	Narrative review	110 studies were selected (1995-2008). Results of five strategies to encourage settlement in rural and remote areas. No study with convincing evidence. Strong evidence only for the selection of students (rural origin as an isolated criterion with stronger evidence - OR 2.5 to 3.5; career intention when starting graduation and female gender, the latter with a negative impact) and linked residency program (stronger evidence). Rural training/internships with conditions for qualified clinical practice (moderate evidence).	1-Selection of students of rural origin; 2-Curricula with long-term clinical practice in rural communities, with good infrastructure and experienced preceptorship; 3-Qualified tutoring in specialties related to PHC.
Barrett, Martin, Lipsky e Lutfiyya (2011) *Academic Medicine*	Narrative review	72 studies were selected (1966-2009). Association between the quality of rural training and the choice of a PHC specialty (89% of studies); three times more chances of future work in rural areas, when compared to the national average (31% of studies). Few studies, with inconclusive results, on the settlement in these areas (6% of the studies).	1-Graduation programs included in rural areas.
Crampton, McLachlan e Illing (2013) *Medical Education*	Systematic review	54 articles selected, mostly from Canada and Australia - rural context (1991-2011). Schools located in unassisted areas promoted an increase in the number of professionals settled in rural areas, greater (but not exclusively) of doctors with rural origin. Studies have not been conclusive regarding long-term permanence or about the impacts on small towns. There were improvements in training (clinical knowledge, confidence, interpersonal skills) and equivalence in clinical competences between rural and traditional schools; in some studies, rural schools have better scores in clinical and relational skills.	1- Extended training (duration of around two years) in PHC carried out in rural and unassisted urban areas; 2-Body of preceptors with qualification and experience in PHC, FCM and Rural Medicine.
Viscomi, Larkins e Gupta (2013) *Canadian Journal of Rural Medicine*	Narrative review	86 studies selected (2002-2012) - mostly from Canada and Australia Studies with family doctors working in rural and/or remote areas have shown that the most important educational factors (studies with higher quality scores) were: preparation programs for high school (HS) students from rural areas; selection of students (rural origin, older, male, partner of rural origin); community-based curricula; longer-term training; campuses in rural areas; qualified clinical experiences under FCM preceptorship. Some studies have shown that the quality of rural experiences can attract students of urban origin.	1-Programs for the preparation of students since HS and selection of students of rural origin and / or who attended HS and/or who have lived for at least 6 years in these areas; 2-Positive experiences in elective FCM disciplines developed in rural regions, with exposure to appropriate rural elective content, teachers acting as good reference and students reaching an understanding on the needs of rural communities.
Farmer, Kenny, McKinstry e Huysmans (2015) *Human Resources for Health*	Integrative review	37 studies were selected (2000-2012). Evidence that rural exposure during medical graduation (basic cycle and internship) increased the probability of working in rural areas, with averages above national ones (26 to 67%). The duration of activities in rural areas was identified as an important factor, but few studies (3) showed a ratio between an increase in the time of rural experiences and an increase in settlement rates.	1-Rural origin is considered the strongest isolated predictor for rural practice; 2-Graduation in rural areas and with a longer time of clinical experience in these areas.

Continue...

Table 1
Continuation

Author / Year / Journal	Design of Review	Main results	Predictors related to medical education
Myhre, Bajaj e Jackson (2015) *Rural and Remote Health*	Integrative Review	17 studies were selected (1970 to 2014). Most determining factors for students of urban origin were financial, followed by educational ones. The financial incentive associated with recruitment (80% of students accumulate high debt), with many choosing small towns close to large centers due to job opportunities. Education also has a great influence, especially the quality of the preparatory school for selection, increasing the students' interest, the characteristics of medical education and the qualification profile of teachers/preceptors.	1-Quality of the preparatory school for the selection of students; 2-Profile and experience of teachers / preceptors; 3-Relationship between the student and the preceptor; 4-Duration of contact with users and the community; 5-Local infrastructure; 6- Valuation and institutional stimulation for students of urban origin with an interest in these areas.
Goodfellow et al. (2016) *Academic Medicine*	Systematic review and meta-analysis	72 studies were selected (2007 to 2015). The predictors of settlement in unassisted rural and urban areas found in the studies were the personal aspects (19 studies): having grown up in the rural area (7 studies, 1.7 times more likely to settle), ethnic (14 studies) and participation in International Medicine programs (12 studies with little evidence). Also, community and PHC-oriented curricula, in disadvantaged urban areas (8 studies) and in rural areas (12 studies), with a settlement average of 53% to 67%, with a strong association between the place of graduation and work, and 51% of doctors working in the same state where they graduated. A study showed a 10-fold higher chance of settlement among students in these programs. Participating in financial incentive programs with debt reduction associated with compulsory work (about 2 years) is a strong predictor for the short term.	1-Type of school selection, favoring the admission of students who grew up or attended HS in unassisted areas, either rural or urban; 2- Location of schools in rural areas (satellite campuses) or underprivileged urban areas; 3- Community-based curriculum and focused on PHC, which allows students to get closer to these communities.
Reeve et al. (2016) Medical Teacher	Systematic review	22 studies were selected. Schools with social accountability (SAHPE) promoted positive impacts on the training quality (10 studies), on the workforce through greater settlement (6 studies) and on the health of the local community (5 studies). Training (5 studies) - equivalence of the clinical training quality in four studies, greater effectiveness in relation to the needs of the population compared to schools in the large cities. Community health: one study with improved access, two studies with positive changes in the population's behavior and one study with a reduction in infant mortality. Workforce (6 studies) with greater retention and improvement in the quality of professionals.	1-Selection processes valuing students from rural areas, students from disadvantaged and excluded minorities; 2-Strategies to avoid dropout of these students; 3-Formal strategies for integration with the local community and the service and health network; 4-Education based on qualified practices of prolonged immersion in these communities; 5-Development of educational projects defined by the needs of the community.
Guilbault e Vinson (2017) *Education for Health*	Systematic review and meta-analysis	Students from schools located in unassisted areas are 3 times more likely (RR = 2.94) to work in these areas, compared to students from other locations. Students from schools located in unassisted areas are 4 times more likely (RR = 4.35) to work in PHC, compared to students from other locations.	1-Large number of students belonging to excluded minorities; 2-Curricula with problematization methodologies and activities in rural areas since the basic cycle of the course, with increasing complexity; 3-Preceptors with experience in FCM/PHC; 4-Satellite campuses in rural areas, with rotating training from 12 weeks to 32 weeks, in the 3rd and 4th years of the medical course.

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Some studies have highlighted the rural origin of the student's partner as a criterion that favored the professional choice for unassisted areas, even by doctors of urban origin [27,29]; others, the relevant role of the selection of students belonging to ethnic minorities – in these cases, those of Latin or Asian origin [32,33]; and, interestingly, in two reviews gender issues represented a strong determinant of future professional choices. In the latter case, being female was considered a negative predictor of medical settlement, although the authors themselves consider that this aspect is also influenced by support policies for women, such as improving living conditions and access to education and leisure, among others [27,29].

The quality of training also had a great influence on the professional choice of graduates, especially for students of urban origin. Many of these professionals who chose to work in rural or remote areas reported that the most determining factors for their decision were the experience of the preceptors and teachers, particularly in PHC, Family Medicine and Rural Medicine, as well as the local infrastructure, allowing for excellent clinical learning and an effective approach to local health needs [29,31].

Still regarding the students of urban origin, the positive results achieved with the association of educational strategies and financial incentive and recruitment policies stand out [27]. However, when these strategies were independently implemented, they showed, respectively, moderate and weak evidence of settlement, and only in the short term, which confirms the fundamental role of implementing structural educational strategies.

The curricular structure of undergraduate courses has a determining role, with emphasis on community-based curricula, with a focus on PHC and that adopt longitudinal practices distributed throughout the course, starting in the first periods and continuing up to the last year, with increasing complexity and workload [26,27,29,31-33,36]. The definition of the ideal workload for training and internships in these strategic regions remains a gap in research. Some studies have indicated that 20 to 32 weeks is the minimum duration for good results [29,37], while other authors have recommended rotary training/internships during the third and fourth years or full-time over the last two years of the medical course [26,31].

In many universities, there are specific curricular programs aimed at reducing the shortage of doctors in priority regions, which have voluntary adherence and whose participants are mostly students with ties to the specific regions where they are developed. However, despite achieving high rates of professional settlement and retention, the main limitation of such programs is the low adherence by the group of students, so that the authors defend the need for mandatory training, with a comprehensive approach throughout the entire medical undergraduate school[30].

One of the reviews analyzed the Social Accountability in Health Professional Education - SAHPE, adopted by schools of medicine and health sciences with the explicit mission of increasing equitable access to health services, being the improvement in the distribution of medical professionals one of its greatest purposes. These institutions constituted a virtual network known as THEnet (Training Health Equity Network), with partner schools located in high, medium and low-income countries, most of which are located in isolated rural communities and poorer urban regions. These schools have curricular structures aimed at reducing inequality in the distribution of professionals and achieve significant results in rates of settlement, with retention for a considerably longer mean time than national averages[33]. These results show that their strategies can be considered strong predictors of settlement, either through the selection of students with regional ties, belonging to excluded minorities and/or those who show interest in the practice in these regions with professional scarcity, or by building curricula that encourage the immersion of students in communities through training and internships conducted by qualified preceptors, with extensive workload and many projects aligned with the needs of local services and communities.

The location of medical schools in unassisted, rural or urban areas was a prominent predictor in several of the analyzed studies, being associated with higher rates of professional settlement [28,30,32,36,37]. The review by Farmer et al. [30] is noteworthy, in which comparative studies between the results of urban and rural campuses, from the same university, concluded that the latter had higher rates of settlement. The importance of the location of medical schools and/or their satellite campuses, in unassisted urban or rural regions, was reinforced by a recent meta-analysis, of which results highlight a three-fold higher probability (RR = 2.94) that students graduating from these schools come to settle in these regions after graduation, in relation to other students. Moreover, these students show a four-fold higher probability (RR = 3.94) of working in PHC, when compared to the others [36].

Farmer et al. [30] also compared studies of institutions with full-time and part-time graduation in rural areas, with better results or the first ones, which achieved averages of 30 to 56% of settlement among their graduates, well above the national averages, in addition to pointing out, although in a small number of studies (3 out of 17), the possibility of measuring results and confirming an increase in settlement directly proportional to the duration of students' exposure to experiences in rural areas.

Finally, all the reviews point out the importance of the insertion of students in these regions with a shortage of doctors, and that the positive results regarding the settlement occurred depending on the quality of the experienced practices, whether through a full-time or part-time graduation. These studies highlighted, as decisive factors, the specialty and experience of preceptors and/or teachers, the local infrastructure and the relationship between the training institution, health services and communities [28,32,36,37].

Likewise, Reeve et al.,[33] recommended the formalization of these agreements, as a way of ensuring teaching-service-community integration, understanding that the greater the approximation and understanding of health needs and the local culture, the higher the possibility of future work with these populations.

FINAL CONSIDERATIONS

Among the educational predictors of the doctors' settlement identified in this study, stands out the existence of selective processes that prioritize the admission of students previously linked to the remote and unassisted areas, the construction of curricular structures with problematization methodologies focused on local health issues and with emphasis on the clinical approach of PHC and FCM (Family and Community Medicine). Also noteworthy is the quality of the formative experiences lived by students during graduation, which, in turn, involve teacher training and experience, as well as the infrastructure and location of these institutions in strategic areas, allowing students to get closer to vulnerable communities.

However, it is important to note that the development of educational

strategies that include such predictors, in addition to being complex from an operational point of view, demands the confrontation of sociocultural, economic and political factors that often transcend the governance of educational institutions. In other words, although certain aspects are likely to change within the restricted scope of institutions (e.g., characteristics of selection processes and curricular matrices), others involve issues and disputes that permeate society as a whole and, therefore, systemic interventions, such as incentives for university teaching considering the rest of the medical labor market and criteria for choosing strategic locations for opening seats in undergraduate courses, among others.

Regarding the characteristics of the study itself, although the small number of selected reviews can be pointed out as a methodological limitation, the fact that they are robust studies, coming from different countries and developed in different scenarios, make the results shown here consistent. Especially by pointing out promising trends for new studies (e.g.: the role of ethnic and gender issues in policies of medical attraction and settlement), reiterating the need for greater conceptual uniformity among studies (in order to ensure more solid scientific evidence on the subject) and the importance of conducting researches (especially reviews) that contemplate the Latin American context and, specifically, Brazil, where there is still little literature on the subject.

The results presented here intend to contribute to the effectiveness of comprehensive educational strategies and public policies, such as those proposed by the PMM and international equivalents to fight the shortage of doctors in remote and vulnerable areas, aiming to reduce inequalities in access to care, both globally and nationally.

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AUTHORS' CONTRIBUTIONS

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CONFLICTS OF INTEREST

There are no conflicts of interest.

ADDRESS FOR CORRESPONDENCE

Erika Maria Sampaio Rocha. Universidade Federal do Espírito Santo (Ufes), Avenida Marechal Campos 1468, Bonfim, Vitória, ES, Brasil, CEP: 29047-105.

E-mail: emsampaiorocha@gmail.com